

What is claimed:

1. An isolated nucleic acid molecule, comprising a gene located on
Arabidopsis thaliana chromosome 1, the disruption of which is associated with a
5 failure to maintain homolog attachment during meiotic prophase I.

2. The nucleic acid molecule of claim 1, which encodes a protein
having a cyclin domain.

10 3. The nucleic acid molecule of claim 2, wherein the gene is composed
of exons that form an open reading frame having a sequence that encodes a
polypeptide approximately 578 amino acids in length.

15 4. A cDNA molecule comprising the exons of the nucleic acid of claim
3.

5. The nucleic acid of molecule of claim 3, wherein the open reading
frame encodes an amino acid sequence at least 70% identical to the cyclin domain of
SEQ ID NO:2.

20 6. The nucleic acid molecule of claim 3, wherein the open reading
frame encodes an amino acid sequence which is at least 50% identical to SEQ ID
NO:2 over the entire length of SEQ ID NO:2.

25 7. The nucleic acid molecule of claim 6, wherein the open reading
frame encodes SEQ ID NO:2.

8. The nucleic acid molecule of claim 6, which comprises an open
reading frame having the sequence set forth in SEQ ID NO:1.

30 9. An oligonucleotide between about 15 and 100 nucleotides in length,
which specifically hybridizes with either strand of the nucleic acid molecule of claim
1.

10. A polypeptide produced by expression of the nucleic acid molecule of claim 1.

5 11. Antibodies immunologically-specific for the polypeptide of claim 9.

12. A vector for transforming a plant cell, comprising the nucleic acid molecule of claim 1.

10 13. A transformed plant cell comprising the vector of claim 12.

14. An isolated nucleic acid molecule comprising an open reading frame of a gene located on Arabidopsis chromosome 1, the open reading frame having
15 a sequence selected from the group consisting of:

- a) SEQ ID NO:1;
- b) a sequence that is at least 80% identical to SEQ ID NO:1;
- c) a sequence encoding a polypeptide having SEQ ID NO:2;
- d) a sequence encoding a polypeptide having a at least 50% identity to

20 SEQ ID NO:2;

e) a sequence encoding a polypeptide having at least 70% identity to the cyclin domain of SEQ ID NO:2; and

f) a nucleotide sequence that hybridizes with SEQ ID NO:1 under stringent conditions,

25 wherein stringent conditions are

hybridizing for at least 6 hours at 37°C in 5X SSC, 5X Denhardt's reagent, 1.0% SDS, 100 µg/ml denatured fragmented salmon sperm DNA, 0.05% sodium pyrophosphate; and

washing once for 5 minutes at room temperature in 2X SSC and 1%
30 SDS, once for 15 minutes at room temperature in 2X SSC and 0.1% SDS, once for 30 minutes at 37°C in 1X SSC and 1% SDS and four times for 30 minutes each at 42°C in 1X SSC and 1% SDS.

15. A polypeptide, produced by the expression of the isolated nucleic acid molecule of claim 14.

5 16. Antibodies immunologically specific for the polypeptide of claim 15.

17. A vector for transforming a plant cell, comprising the nucleic acid molecule of claim 14.

10 18. A transformed plant cell comprising the vector of claim 17.

19. A plant comprising a mutation in an SDS gene, wherein said mutation confers an inability to maintain homolog attachment during meiosis.

15 20. A plant gene promoter comprising a nucleic acid sequence which when operatively linked to a cDNA sequence, confers meiosis-specific expression on said cDNA sequence.

20 21. An isolated nucleic acid comprising an SDS promoter, wherein said promoter comprises the sequence set forth in SEQ ID NO:3.

22. An isolated nucleic acid comprising a genomic SDS sequence, wherein said sequence is at least 70% identical to that of SEQ ID NO:4, over the entire length of SEQ ID NO:4.

25 23. The isolated nucleic acid of claim 22, wherein said sequence comprises the polynucleotide sequence of SEQ ID NO:4.

30 24. A plant cell comprising a mutation in an SDS gene, wherein such mutation confers onto said plant cell at least one of the phenotypes of sterility and inability to produce pollen.